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EXAMINER	
LEE, SHUN K	

ART UNIT	PAPER NUMBER
2884	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/800,366	WOOD, ROLAND A.	
	Examiner	Art Unit	
	Shun Lee	2884	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12,14-25,27 and 29-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12,14-25,27 and 29-38* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *20080519*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 2, 7-12, 14-17, 20-25, 27, 29, and 33-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood *et al.* (US 5,675,149) and incorporated by reference US Patent 5,420,419 (Wood) in view of Duvall, III (US 5,258,619).

The specification states (pg. 2, lines 6 and 7) that the " ... term "frame time" refers to a time in which a microbolometer array produces each complete picture or image of an object being viewed".

In regard to claim **1**, Wood *et al.* disclose a method for improving performance sensitivity and facility of operation of an array including microbolometers, comprising:

(a) applying N bias pulses substantially sequentially during a frame time (*i.e.*, the exposure time for producing a complete image; column 5, lines 47-53) to each microbolometer in the array, wherein N is 2 or greater;

(b) measuring N resulting signals corresponding to the N bias pulses (*i.e.*, multiple measurements; column 5, lines 47-53);

(c) computing an average signal value from the N resulting signals corresponding to each microbolometer in the array (*i.e.*, averaging of sensor signals; column 5, lines 47-53) during the frame time (*i.e.*, the exposure time); and

(d) producing an output signal based on the computed average signal value for each microbolometer in the array during the frame time (*i.e.*, the exposure time).

The method of Wood *et al.* lacks that the N bias pulses have a shorter time duration and frequency, selected such that a resulting temperature in each of the microbolometers in the array due to such applying of N bias pulses is substantially uniform during the frame time, wherein the time duration of each bias pulse is 1/N times that of a single pulse suitable for reading the array. Duvall, III teaches (column 6, lines 43-53) that a swept bias technique includes adjusting the waveform parameters of rise-time, fall-time, peak to peak values, time between pulses, pulse slope, pulse width, and pulse amplitude which best meets a given detector and design situation in order to minimize unwanted detector heating. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the bias pulse waveform parameters (*e.g.*, pulse duration is 1/N times that of a single pulse) in the method of Wood *et al.*, in order to meet a given detector and design situation so as to minimize unwanted detector heating (*e.g.*, a resulting temperature in each of the microbolometers is substantially uniform).

In regard to claim **2** which is dependent on claim 1, Wood *et al.* also disclose (column 1, lines 55-58) recording and displaying IR images. Inherent in the formation of images is repeating the applying, measuring, computing, and producing steps to compute output signals during each frame time in order to form IR images.

In regard to claim **7** which is dependent on claim 1, Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 6, lines 18-34) that the bias pulses are substantially equal in magnitude.

In regard to claim **8** which is dependent on claim 1, the method of Wood *et al.* lacks that the bias pulses are substantially equally spaced in time. Duvall, III teaches (column 6, lines 43-53) that a swept bias technique includes adjusting the waveform parameters of rise-time, fall-time, peak to peak values, time between pulses, pulse slope, pulse width, and pulse amplitude which best meets a given detector and design situation in order to minimize unwanted detector heating. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the bias pulses waveform parameters (*e.g.*, pulses are substantially equally spaced in time) in the method of Wood *et al.*, in order to meet a given detector and design situation so as to minimize unwanted detector heating as taught by Duvall, III.

In regard to claim **9** which is dependent on claim 1, Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 2, lines 17-20) that the bias pulses comprise voltage bias pulses.

In regard to claim **10** which is dependent on claim 1, Wood *et al.* also disclose (US 5,420,419 column 7, lines 26-28) that the resulting signals comprise current signals.

In regard to claim **11** which is dependent on claim 1, Wood *et al.* also disclose (column 5, lines 47-53) that multiple measurements and averaging of sensor signals is equivalent to long exposures. Inherent in an average is at least two sensor signals each

associated with an applied bias pulses and thus there are in the range of about 2 to 100 bias pulses dependent on the length of the exposure.

In regard to claim **12** which is dependent on claim 1, Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 6, lines 18-34) that the bias pulses have time duration in the range of about 0.1 to 20 microseconds (*e.g.*, 5-6 μs). The method of Wood *et al.* lacks that the temperatures varies less than one degree Celsius. Duvall, III teaches (column 6, lines 43-53) that a swept bias technique includes adjusting the waveform parameters of rise-time, fall-time, peak to peak values, time between pulses, pulse slope, pulse width, and pulse amplitude which best meets a given detector and design situation in order to minimize unwanted detector heating. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the bias pulse waveform parameters in the method of Wood *et al.*, in order to meet a given detector and design situation so as to minimize unwanted detector heating (*e.g.*, temperatures varies less than one degree Celsius).

In regard to claim **14**, Wood *et al.* disclose an infrared radiation detector apparatus comprising:

(a) microbolometers in an array (column 5, line 65 to column 6, line 1);

(b) a timing circuit coupled to the array to apply (US 5,420,419 column 6, lines 18-34) N bias pulses substantially sequentially to each microbolometer in the array during a frame time (*i.e.*, the exposure time for producing a complete image; column 5, lines 47-53);

(c) a measuring circuit coupled to the array to measure N resulting signals associated with each of the applied N bias pulses (*i.e.*, multiple measurements; column 5, lines 47-53) during the frame time (*i.e.*, the exposure time);

(d) a computing circuit coupled to the measuring circuit to compute an average signal value (*i.e.*, averaging of sensor signals; column 5, lines 47-53) for each microbolometer in the array from the measured N resulting signals during the frame time (*i.e.*, the exposure time); and

(e) an output circuit coupled to the computing circuit to produce an output signal based on the computed average value for each microbolometer in the array during the frame time (*i.e.*, the exposure time) is inherent in displaying an image corresponding to the output signals.

The apparatus of Wood *et al.* lacks that a resulting temperature in each of the microbolometers in the array due to such applying of N bias pulses is substantially uniform during the frame time. Duvall, III teaches (column 6, lines 43-53) that a swept bias technique includes adjusting the waveform parameters of rise-time, fall-time, peak to peak values, time between pulses, pulse slope, pulse width, and pulse amplitude which best meets a given detector and design situation in order to minimize unwanted detector heating. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the bias pulse waveform parameters (*e.g.*, pulse duration and duty cycle) in the apparatus of Wood *et al.*, in order to meet a given detector and design situation (*e.g.*, the signal resulting from the rise in temperature

caused by the N bias pulses is less than the signal resulting from incident infrared radiation) so as to minimize unwanted detector heating.

In regard to claim **15** which is dependent on claim 14, Wood *et al.* also disclose (column 2, lines 57-59) that the output circuit further comprises an integrator (integrating preamplifiers 26) and an A/D converter (32) wherein said output signal produced is a digital signal value for each microbolometer in the array.

In regard to claim **16** which is dependent on claim 15, Wood *et al.* also disclose (column 4, lines 5-24) a digital image processor (36), coupled to the output circuit to receive the digital signal value associated with each microbolometer in the array and correct the received digital signal value for image defects.

In regard to claim **17** which is dependent on claim 16, Wood *et al.* also disclose (column 4, lines 5-24) that the digital image processor (36) further comprises a correction circuit, to apply a corrective electrical signal based on a correction value to the output signal to correct for resistance non-uniformity in each microbolometer to obtain a substantially uniform output signal value.

In regard to claim **20** which is dependent on claim 14, Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 6, lines 18-34) that the bias pulses are substantially equal in magnitude.

In regard to claim **21** which is dependent on claim 20, the cited prior art is applied as in claim 8 above.

In regard to claim **22** which is dependent on claim 14, Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 2, lines 17-20) that the bias pulses comprise voltage bias pulses.

In regard to claim **23** which is dependent on claim 22, Wood *et al.* also disclose (US 5,420,419 column 7, lines 26-28) that the resulting signals comprise current signals.

In regard to claim **24** which is dependent on claim 14, Wood *et al.* also disclose (column 5, lines 47-53) that multiple measurements and averaging of sensor signals is equivalent to long exposures. Inherent in an average is at least two sensor signals each associated with an applied bias pulses and thus there are in the range of about 2 to 100 bias pulses dependent on the length of the exposure.

In regard to claim **25** which is dependent on claim 24, Wood *et al.* also disclose (US 5,420,419 Fig. 6 and column 6, lines 18-34) that the bias pulses have time duration in the range of about 0.1 to 20 microseconds (*e.g.*, 5-6 μs).

In regard to claim **27**, the cited prior art is applied as in claims 1, 12, and 14 above.

In regard to claim **29** which is dependent on claim 27, the cited prior art is applied as in claim 15 above.

In regard to claim **33** which is dependent on claim 27, the cited prior art is applied as in claim 20 above.

In regard to claim **34** which is dependent on claim 27, the cited prior art is applied as in claim 21 above.

In regard to claims **35** and **36** which are dependent on claim 27, the cited prior art is applied as in claims 22 and 23 above.

In regard to claims **37** and **38** which are dependent on claim 27, the cited prior art is applied as in claims 24 and 25 above.

3. Claims 3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood *et al.* and incorporated by reference US Patent 5,420,419 in view of Duvall, III as applied to claim 2 above, and further in view of Applicant Admitted Prior Art.

In regard to claim **3** which is dependent on claim 2, the modified method of Wood *et al.* lacks applying a corrective electrical signal to the output signal to correct for resistance non-uniformity between the microbolometers of the array to obtain a substantially uniform output signal value. Applicant admits (first paragraph on pg. 6) it is known in the art (such as US Patent 4,752,694) to apply a corrective electrical signal to the output signal to correct for resistance non-uniformity between the one or more microbolometers of the array (*i.e.*, "coarse non-uniformity correction") to obtain a substantially uniform output signal value. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to apply a corrective electrical signal in the modified method of Wood *et al.*, in order to obtain a substantially uniform output signal value.

In regard to claim **4** which is dependent on claim 3, Wood *et al.* also disclose (column 2, lines 57-59) an integrator (integrating preamplifiers 26) and an A/D converter (32) to converting the substantially uniform output signal associated with each microbolometer to a digital signal value.

In regard to claim **5** which is dependent on claim 4, Wood *et al.* also disclose (column 4, lines 5-24) passing the digital signal values associated with each microbolometer in the array through a digital image processor to correct for image defects.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wood *et al.* and incorporated by reference US Patent 5,420,419 and Duvall, III in view of Applicant Admitted Prior Art as applied to claim 5 above, and further in view of Thiede *et al.* (US 5,129,595).

In regard to claim **6** which is dependent on claim 5, the modified method of Wood *et al.* lacks that the image defects comprise fine offsets, gain non-uniformity, and dead pixels. Image defects such as fine offsets, gain non-uniformity, and dead pixels are well known in the art. For example, Thiede *et al.* teach (column 7, lines 45-66) the correction of gain non-uniformity and dead pixels in order to fully compensate for array non-uniformity. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to correct for gain non-uniformity and dead pixels in the modified method of Wood *et al.*, in order to fully compensate for array non-uniformity.

5. Claims 18, 19, and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wood *et al.* and incorporated by reference US Patent 5,420,419 in view of Duvall, III as applied to claims 17 and 29 above, and further in view of Thiede *et al.* (US 5,129,595).

In regard to claim **18** which is dependent on claim 17, the cited prior art is applied as in claim 6 above.

In regard to claim **19** which is dependent on claim 18, Wood *et al.* also disclose (column 4, lines 5-24) that the digital image processor (36) further comprises digital memories to store the correction values for each microbolometer in the array.

In regard to claim **30** which is dependent on claim 29, the cited prior art is applied as in claim 6 above.

In regard to claim **31** which is dependent on claim 30, the cited prior art is applied as in claims 16 and 17 above.

In regard to claim **32** which is dependent on claim 31, the cited prior art is applied as in claim 19 above.

Response to Arguments

6. Applicant's arguments filed 19 May 2008 have been fully considered but they are not persuasive.

Applicant argues that what was not known, nor easily derivable from the prior art, was to increase the frequency of the pulses and at the same time reduce the duration of the pulses. Examiner respectfully disagrees. Duvall, III teaches (column 6, lines 43-53) that a swept bias technique includes adjusting the waveform parameters of rise-time, fall-time, peak to peak values, time between pulses, pulse slope, pulse width, and pulse amplitude which best meets a given detector and design situation in order to minimize unwanted detector heating. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to adjust the bias pulse waveform parameters (*e.g.*, pulse duration and duty cycle) in the apparatus of Wood *et al.*, in

order to meet a given detector and design situation such as minimizing unwanted detector heating.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (571) 272-2439. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571) 272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. L./
Examiner, Art Unit 2884

/David P. Porta/
Supervisory Patent Examiner, Art Unit 2884